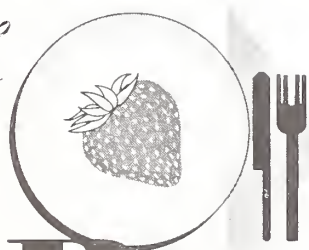


## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.





Food &amp; Nutrition

# Research Briefs

## **Overweight? Cutting Body Fat Before Dietary Fat Is Better**

Are you overweight—with a body mass index (BMI) between 25 and 30—and your blood lipids are higher than your doctor would like? Then you'll probably benefit more from cutting those extra pounds by eating fewer calories and increasing physical activity than you would from cutting dietary fat. That's the gist of a study done in Spain by researchers at the University of Cordoba Medical School and at the ARS-funded center in Boston.

Two different heart-healthy diets were less effective at improving the cholesterol profile of overweight men than of normal-weight men. The findings extend earlier evidence that dietary changes don't have much of an effect on the blood lipids of obese people—those who have a BMI over 30.

Total cholesterol in the overweight men dropped less than half that of the lean men—7 versus 16 percent—after switching from a diet high in total fat and saturated fat to one recommended by the National Cholesterol Education Program (NCEP). Likewise, artery-damaging LDL cholesterol dropped 9 percent in the overweight group versus 21 percent in the lean group. The NCEP diet is low in fat—28 percent of total calories—with only 10 percent saturated fat.

A second heart-healthy diet also had less impact on total and LDL cholesterol in the overweight men. Although this diet was high in fat—38 percent of total calories—more than half of it (22 percent) was monounsaturated fat, the predominant fat in olive or canola oils. However, this diet produced a much bigger drop in triglycerides in the overweight group, compared to the lean group: 26 percent versus 4 percent. High triglycerides are associated with reduced glucose tolerance—the earliest stage of diabetes. And evidence is mounting that high triglycerides independently increase risk of heart disease, say the researchers.

They concluded, in the *Journal of Nutrition*, 1998 (vol. 128, pp. 1144-1149), that it's more important for overweight people to lose weight than change the fat composition of their diets. And it appears that these people

would benefit from substituting olive or canola oil for saturated fat in their diet

For more information, contact Jose M. Ordovas, (617) 556-3102, Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, MA; [ordovas\\_li@hnrc.tufts.edu](mailto:ordovas_li@hnrc.tufts.edu).

## **High-Fiber, Low-Fat Means Better Nutrition for Teens**

Few teens have eating habits that mirror the Dietary Guidelines for Americans for fat and fiber. But those who do have more nutritious diets overall. That's according to a survey of 319 teens who were asked to recall what they had eaten in the prior 24 hours. Only one-third of the students in the study had the more healthful eating pattern, including just nine percent of non-white teens.

The teens who reported diets rich in fiber and low in total fat consumed more vitamins and minerals and less total cholesterol and saturated fat than their peers. Their diets included more iron, zinc, calcium, folate, and vitamin C, niacin, thiamin, riboflavin, magnesium, phosphorus, and vitamins A, B6, and B12. And the energy level was about the same as those from most other groups, easing concern that low-fat, high-fiber diets might be too low in energy for growing teens. The findings are reported in the online issue of the *Journal of Pediatrics: Pediatrics 2000* (vol. 105, p. e21).

The teens were grouped into one of four eating patterns: high-fat/high-fiber, high-fat/low-fiber, low-fat/low-fiber, and low-fat/high-fiber. Food reports classified as low-fat met the dietary guidelines that fat should provide no more than 30 percent of total daily energy, while high-fat diets had levels of 40 percent or more. High-fiber diets provided at least 20 grams of fiber and met the "age plus five" recommendation for this age group. This recommends five grams of fiber plus one gram per year of life through age 20. Low-fiber diets contained 15 grams or less.

Individuals who met the dietary recommendations for fat and fiber ate more whole-grain breads and ready-to-eat

cereals, fruit, salads, beans, vegetables, smaller portions and leaner cuts of meat, skinless poultry, low-fat dairy products, and few fried and high-fat foods.

*For more information, contact Theresa Nicklas, (713) 798-7087, Children's Nutrition Research Center at Baylor College of Medicine, Houston, TX; [tnicklas@bcm.tmc.edu](mailto:tnicklas@bcm.tmc.edu).*

### **Whey, Soy Proteins Cut Breast Cancer in Rats**

Each year, 180,000 new breast cancer cases are diagnosed in U.S. women. Preliminary findings with rats suggest that adding whey or soy protein to the diet may help guard against breast cancer.

Researchers compared the protective effects of soy protein and whey protein against chemically induced tumors in the milk-producing glands of rats. The test rats—a major animal model for breast cancer—got one of three diets, each with a different protein: a control diet containing the major milk protein casein; a diet made with soy protein isolate; or a diet with processed whey protein. Whey is a class of minor proteins found in milk.

All rats in the control group developed at least one tumor. But soy protein cut the rate by nearly one quarter, with 77 percent developing at least one tumor. Whey protein cut the rate nearly in half; only 54 percent of the rats eating whey protein had tumors. And among the whey group, the animals that developed mammary cancer had fewer and smaller tumors than control rats, the researchers reported in *Cancer, Epidemiology, Biomarkers and Prevention*, 2000 (vol. 9, 113-117). They have filed a patent on the whey compound.

*For more information, contact Thomas M. Badger, (501) 320-2785, Arkansas Children's Nutrition Center, Little Rock, AR; [BadgerThomasM@exchange.uams.edu](mailto:BadgerThomasM@exchange.uams.edu).*

### **Soy Soothes the Circuits in Body Cells**

Our body cells are constantly barraged with chemical signals that pester them to respond. Miraculously, they do a pretty good job of filtering out the “noise” and staying on purpose. But some cells lose the ability to regulate these signals, and they react before they should. Researchers now believe this loss contributes to chronic diseases, such as cancer and heart disease. For example, if an order to divide gets “heard” by too many cells, it could lead to unrestrained growth, as in cancer or an overactive immune system.

Test-tube studies more than a decade ago showed that a phytonutrient in soy foods—genistein—dampens communication from the cell's surface to its interior. Now, an ARS study gives the first evidence of this dampening effect in an animal.

For four weeks, a researcher fed young rats diets containing soy protein with high or low levels of genistein. Then she measured how the animals' blood platelets responded. Platelets are quite sensitive to outside signals and so are a good model for studying cell signaling. In three different tests, the platelets from the animals receiving the high-genistein diet showed less response to such signals, the researchers reported in the *Journal of Nutritional Biochemistry*, 1999 (vol. 10, pp. 421-426).

Japanese diets, on average, contain about 10 times more soy than North American diets, and the Japanese have a lower incidence of cancer and heart disease. The genistein-rich diet in this study had the equivalent of twice the average Japanese genistein intake. The genistein-poor diet contained the equivalent of the U.S. intake of soy. Tofu, tempeh, and miso are some soy foods rich in genistein and other isoflavones.

*For more information, contact Norberta W. Schoene, (301) 504-8388, Nutrient Requirements and Functions Laboratory, Beltsville, MD; [schoene@307.bhnrc.usda.gov](mailto:schoene@307.bhnrc.usda.gov).*

### **Do Spinal Cord Injury Cases Need More Antioxidants?**

A new study to define the antioxidant needs of people with spinal cord injuries should also help clarify the nutrient requirements of other, less severely injured individuals. The investigation, apparently the first of its kind, will determine whether paralyzed people need more antioxidant nutrients, such as vitamins A, C, and E, or beta-carotene—a compound that the body uses to make vitamin A. The findings could also be applicable in determining the antioxidant requirements of people who have injuries that leave them sedentary for months at a time, or who are gradually losing their mobility because of worsening arthritis, for example.

ARS and University of California at Davis scientists aim to work with 75 northern California adults with spinal cord injuries to learn about their eating habits and to test their antioxidant levels. The findings may help paralyzed people live longer and healthier lives. Right now, Americans with spinal cord injuries live only about 80 percent as long as their peers. Very little research has been done on the special nutrient requirements of those with paralysis. Gunshot wounds and car, motorcycle, or swimming pool accidents are among the leading causes of spinal cord injuries in the United States today. The Paralyzed Veterans of America Spinal Cord Research Foundation, Washington, DC, is funding part of the study.

*For more information, contact Betty J. Burri, (530) 752-4748, Western Human Nutrition Research Center, Davis, CA; [bburri@whnrc.usda.gov](mailto:bburri@whnrc.usda.gov).*

## Dietary Cholesterol Makes LDL Cholesterol More Radical

A little extra cholesterol in our diets may render the “bad” LDL cholesterol in our bloodstream more susceptible to oxidation. That’s what happened to the LDL from a group of older men and women in a study reported in *Atherosclerosis*, 2000 (vol. 149, pp. 83-90). And that’s not good: Evidence suggests that oxidized LDL cholesterol is more apt to provoke the plaques that build up in arteries and increase risk of heart attack and stroke.

The researchers designed 30-percent-fat diets that differed only in the type of fat. One was rich in polyunsaturated fat from corn oil; the other was rich in saturated fat from beef tallow. Otherwise, the foods were identical. And by adding extra cholesterol to each diet—ranging from around 220 to 330 milligrams, depending on the volunteer’s total calorie intake—they approximately doubled the diets’ cholesterol content.

Thirteen men and women between the ages of 46 and 78 ate each of four diets: the corn oil with and without extra cholesterol and the beef tallow with and without extra cholesterol. The type of fat didn’t significantly affect the susceptibility of the volunteers’ LDL to oxidation in a test-tube assay. But the extra cholesterol increased oxidation susceptibility by 28 percent during the corn oil diet and 15 percent during the beef tallow diet.

The volunteers began the study with moderately elevated LDL cholesterol—each having levels greater than 130 milligrams per deciliter. Adding the extra dietary cholesterol prompted a further rise in their total as well as their LDL cholesterol, regardless of the type of fat in the diet. The researchers concluded that the current recommendation to limit dietary cholesterol is both valid and prudent.

*For more information, contact Alice H. Lichtenstein, (617) 556-3127, Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, MA; [lichtenstein@hnrc.tufts.edu](mailto:lichtenstein@hnrc.tufts.edu).*

## BMI Poor Indicator of Body Fat in Kids

An explosion of “super-sized” kids has American health professionals clamoring for improved obesity-screening tools. But preliminary findings from a large-scale study suggest the body mass index (BMI) can produce inaccurate results if factors such as age, sex, maturity, ethnic background, and physical activity are not considered.

The study compared the results of two obesity indexes, the BMI and percent body fat (%Fat), in an ethnically diverse population of 979 boys and girls—ages 3 to 18. One out of six children in the study who had a BMI in the normal range had an unhealthy level of body fat. And

one out of four with a BMI in the at-risk-to-obese range had a body-fat level that was normal, the researchers reported in the *American Journal of Epidemiology*, 1999 (vol. 150, pp. 939-946). The %Fat was determined with a special instrument called DXA.

Two basic assumptions regarding body composition lead to inaccuracies when the BMI is used as a one-size-fits-all screening tool for fatness. One is that individuals who have a BMI within the normal range have an average amount of body fat. The other is that every ounce of body weight over the standard weight for height is fat.

These assumptions generated the most errors for children with BMI values in the gray area between normal weight and overweight, which is a BMI between 18 and 20 for most ages. Body fat in the study children in this BMI range varied from 10 to 40 percent. Males with body-fat levels over 25 percent and females with levels over 30 percent are generally considered obese.

Relying on BMI alone risks the possibility that kids who need some type of intervention to improve their physical activity and eating habits will fall through the cracks. Of equal concern is the risk of mislabeling 25 percent of high-BMI children as at-risk or overweight, despite their normal body-fat percentage, the researchers caution.

*For more information, contact Kenneth Ellis, (713) 798-7131, Children’s Nutrition Research Center at Baylor College of Medicine, Houston, TX; [kellis@bcm.tmc.edu](mailto:kellis@bcm.tmc.edu).*

## Diabetes Risk in Mexican-Americans—Metabolic Glitch?

Ethnic differences in glucose metabolism might help explain why Mexican-Americans are two to three times more likely to suffer from diabetes than their European-American counterparts. Researchers have found that one of the body’s metabolic responses to insulin—which is to minimize the liver’s conversion of glycogen into glucose—is significantly reduced in Mexican-Americans. Glycogen is the storage form of glucose in the liver and muscle tissues.

The researchers believe this could be one of the earliest markers of insulin resistance in Mexican-Americans and a defect that could be contributing to the high rates of type-2 diabetes in this group as a whole. Insulin resistance—the body cells’ insensitivity to the action of insulin—is responsible for 90 to 95 percent of all diabetes cases in Mexican-Americans.

The study involved six Mexican-American males and six European-American males matched for age and body mass index. All were healthy and showed no sign of insulin resistance on a glucose tolerance test, and none had close relatives with diabetes. Their liver glucose production was monitored while fasting and during a six-

hour feeding period designed to test the liver's ability to minimize its own glucose production when food is ingested.

Although no significant differences were noted between the two groups during the fasting studies, important differences appeared when the men were fed. In the European-American men, both of the liver's glucose-producing pathways responded to insulin as expected—quickly shutting down to a trickle. But in the Mexican-Americans, the pathway that converts glycogen to glucose took much longer and required higher levels of insulin to significantly reduce glucose production, the researchers reported in the *American Journal of Physiology (Endocrinology and Metabolism)*, 1999 (vol. 277, pp. E905-914).

Knowing which pathway is affected could help scientists identify the cause—such as a unique gene—responsible for this dysregulation. This might lead to therapies and early lifestyle interventions that help at-risk Mexican-American children before the clinical symptoms of insulin resistance and diabetes appear later in life.

*For more information, contact Farook Jahoor, (713) 798-7084, Children's Nutrition Research Center at Baylor College of Medicine, Houston, TX; fjahoor@bcm.tmc.edu.*

### **Unusual Corn May Counter Iron Deficiency Anemia**

Tomorrow's tortillas, if made with a unique corn from ARS research, may help reduce iron-deficiency anemia. That could be a boon in developing countries where corn-based foods are a part of nearly every meal and in developed nations where iron deficiency is also common. The novel corn has about 66 percent less phytic acid, or phytate, than most common varieties. Phytic acid is thought to reduce the body's ability to absorb certain nutrients, like iron.

In a study of 14 men, scientists from the Institute of Nutrition of Central America and Panama and from the University of California's Berkeley and Davis campuses showed that iron absorption was about 50 percent greater if the men ate tortillas made from flour of the low-phytic-acid corn, compared with normal corn flour. The findings are reported in the *American Journal of Clinical Nutrition*, 1998 (vol. 68, pp. 1123-1127).

Now, University of Colorado researchers are leading an investigation of the effects of the corn on zinc absorption in a study with Guatemalan villagers.

*For more information, contact Victor A. Raboy, (208) 397-4162, ext. 15, Small Grains and Potato Germplasm Research Unit, Aberdeen, ID; vraboy@uidaho.edu.*

### **Cattle Infected With E. coli Mostly in Summer**

In late summer, up to 28 percent of cattle entering processing plants may carry with them strains of the *E. coli* bacterium that causes food poisoning in humans, according to a recent study. Improved laboratory methods allowed the scientists to ferret out the microbe and detect this prevalence level, which is higher than previously reported.

But the research also showed that normal processing procedures can reduce the incidence of *E. coli* 0157:H7 on beef carcasses to less than 2 percent—even in the peak contamination season of July and August. The study, reported in the *Proceedings of the National Academy of Sciences*, 2000 (vol. 97, pp. 2999-3003), included examination of *E. coli* shed in the feces of live cattle, as well as microbes on beef carcasses in commercial processing plants.

During the summer *E. coli* peak, 28 percent of the live cattle entering the processing plants were actively shedding *E. coli* 0157:H7 in their feces. Eleven percent of hide surfaces were also contaminated with the bacterium. After processing was complete, only six of 330 carcasses, or 1.8 percent, showed some level of contamination.

*For more information, contact Danny B. Laster, (402) 762-4109, Roman L. Hruska U.S. Meat Animal Research Center, Clay Center, NE; laster@email.marc.usda.gov.*

The United States Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.

The *Research Briefs* is published quarterly by ARS Information. For further information or addition to the mailing list, contact Judy McBride, nutrition editor, at (301) 504-1628; or write her at 5601 Sunnyside Ave., Rm. 1-2212-b, Beltsville, MD 20705-5129; jmcbride@asrr.arsusda.gov